

Determining clast and magnetic fabric of a subaqueous lahar deposit as a tool for reconstructing paleoflow directions and emplacement processes

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Flow-related fabric of a subaqueously emplaced laharic deposit (Rám Hill Pumiceous Sandstone) were investigated around the middle Miocene Keserűs Hill lava dome group (northern Hungary). A twofold methodology, consisting of image analysis on rock surfaces and low-field anisotropy of magnetic susceptibility (AMS), was used to determine large-scale flow paths and emplacement processes. In addition, comparative measurements of magnetic anisotropy were performed by using an MFK1-FA multifunction kappabridge with 3D rotator (Studynka et al. 2014) at Agico, Inc. (Brno, Czech Republic). The results indicate a very good agreement between the azimuths of a-axis of the most elongated clasts from image analysis and the orientation of K1 susceptibilities from the measurements of the two laboratories. This agreement of fabric direction obtained by the two different methods allows to draw the following implications: 1) Fabric direction-derived large-scale flow paths show a near-radial pattern around the proposed eruption centre (Karátson et al. 2007) of the Keserűs Hill lava dome group (Fig. 1). Thus, our new data on paleoflow directions quantitatively confirm the former, one central vent-dominated volcano-structural reconstruction which was proposed on the basis of facies analysis. 2) Aggradation from multiple lahar pulses is presumable due to the vertical variation of shear direction within the exposures.

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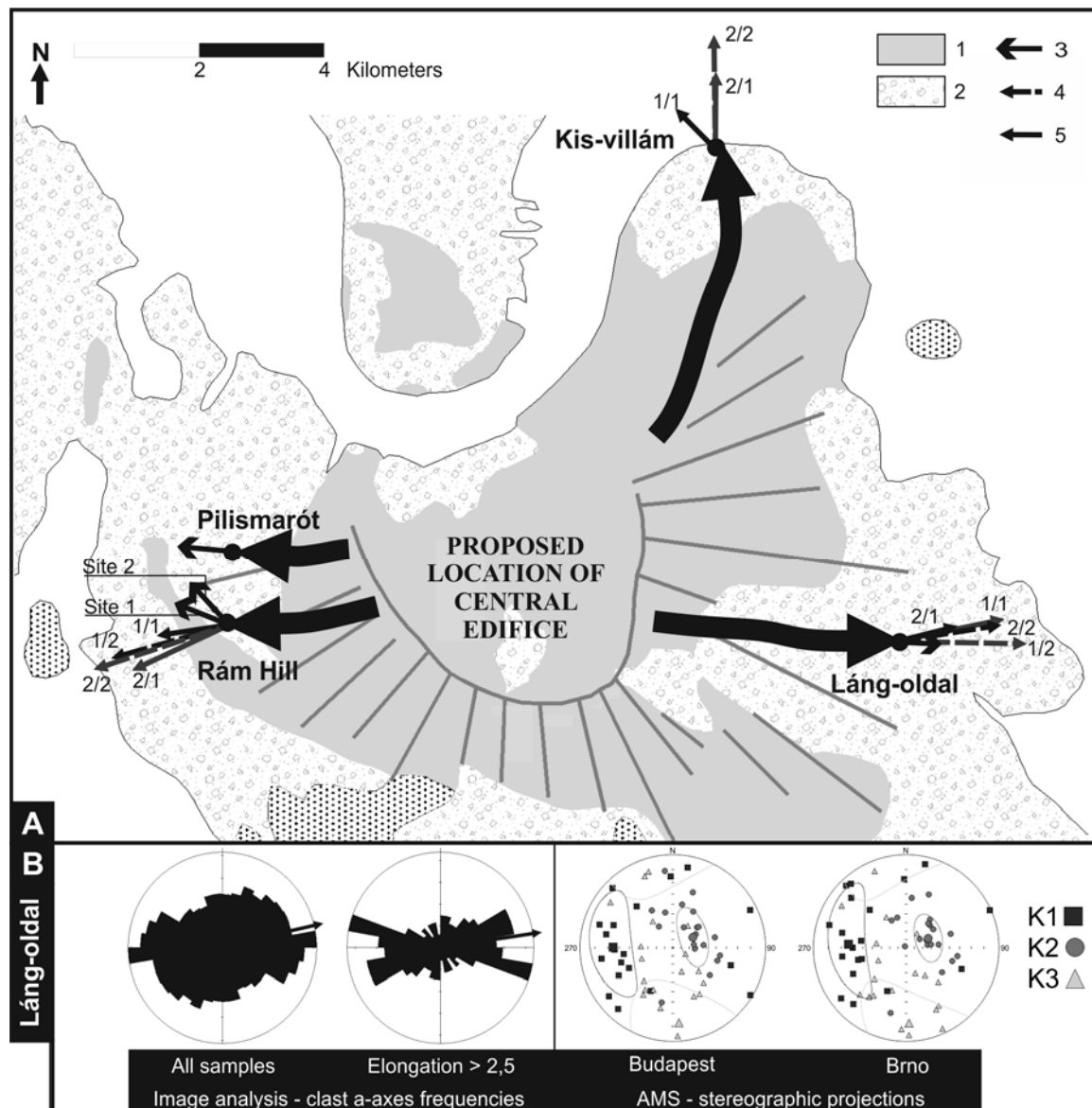


Figure 1: Reconstructed flow paths of the Rám Hill Pumiceous Sandstone in relation to the volcanic structure of the Keszér Hill lava dome group. A) 1 - Volcanic units related to the Keszér Hill volcanic edifice; 2 - Units of ring plain association and other coherent lava and subvolcanic rocks; 3 - directions inferred from AMS pattern; 4 - direction of selected clasts with enhanced elongation; 5 - direction of all clasts; the length of the arrows is proportional to the fabric strength. The large black arrows indicate presumable paleoflow direction on the basis of photo-statistical results. B) Flow directions from the Láng-oldal locality by image analysis and anisotropy of magnetic susceptibility.

References:

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